L7 ANSWER 1 OF 9 CAPLUS COPYRIGHT 2004 ACS on STN

AB The sealant materials for planar intermediate temperature **solid oxide fuel cells** (ITSOFC) are required for the sealing of the different components to prevent from leakage. Besides the gas tightness, the sealants should show good wetting behavior, matching thermal expansion, chemical stability, dimension stability and insulation. It was investigated that a glass-ceramic based on the SiO_2-CaO-B_2O_3-Al_2O_3 system as sealant material applied for ITSOFC operated at 850°C. After heat treatment at 850°C for 2h, the glass ceramic maintained its shape, bonded with 8YSZ electrolyte and Ni-Cr bipolar producing a good gas-tight **seal**, and its thermal expansion coefficient of 8.9+10-6/°C was close to 8YSZ. After 100h, no decrease in **pressure** caused by H_2 or O_2 leaking was observed, its micrograph showed a good connection with clear interface and the thickness of the diffusive layer of elements was less than 5.apprx.10μm. This study shows the glass ceramic sealant is suitable for ITSOFC.

ACCESSION NUMBER: 2004:179567 CAPLUS

TITLE: SiO2-CaO-B2O3-Al2O3 glass ceramics as sealant for planar intermediate temperature **solid oxide fuel cells**

AUTHOR(S): Zheng, Rui; Nie, Huai-Wen; Wang, Da-Qian; Lu, Zhi-Yi; Wen, Ting-Lian

CORPORATE SOURCE: Shanghai Institute of Ceramics, Chinese Academy of Sciences, Shanghai, 200050, Peop. Rep. China

SOURCE: Wuji Cailiao Xuebao (2004), 19(1), 37-42
CODEN: WCXUET; ISSN: 1000-324X

PUBLISHER: Kexue Chubanshe

DOCUMENT TYPE: Journal

LANGUAGE: Chinese

L7 ANSWER 2 OF 9 CAPLUS COPYRIGHT 2004 ACS on STN

AB A novel hybrid compressive mica **seal** was developed that showed an exceptionally low leak rate of .apprx.8.9 + 10-4 sccm/cm (standard cubic centimeters per min per unit leak length of **seal**) at 800°C and a compressive stress of 100 psi, .apprx.740 times lower than that of the conventional compressive mica **seals** (6.6 + 10-1 sccm/cm), at a **pressure** gradient of 2 psi. The hybrid compressive mica **seals** were composed of 2 compliant metallic layers and a mica layer. Three com. available micas were tested in this study. All showed substantial improvements in reducing the leak rates by using the hybrid design. The best results were obtained using muscovite single-crystal mica and 125 μm Ag layers. Using the paper form of muscovite and phlogopite mica, the leak rates were still far superior (.apprx.1 + 10-1 sccm/cm) compared with mica without the compliant Ag layer (6-9 sccm/cm). The microstructure of the mica was examined before and after 800°C leak tests. Results are compared with results for hybrid **seals** using glass interlayers. In addition, an explanation for the substantial reduction of the leak rates is proposed, and the application of the hybrid compressive mica **seals** in planar SOFC stacks is briefly addressed.

ACCESSION NUMBER: 2003:473937 CAPLUS

DOCUMENT NUMBER: 139:168010

TITLE: Novel compressive mica **seals** with metallic interlayers for **solid oxide fuel cell** applications

AUTHOR(S): Chou, Yeong-shyung; Stevenson, Jeffry W.; Chick, Lawrence A.

CORPORATE SOURCE: Materials Resource Department, Pacific Northwest National Laboratories, Richland, WA, 99352, USA

SOURCE: Journal of the American Ceramic Society (2003), 86(6), 1003-1007
CODEN: JACTAW; ISSN: 0002-7820

PUBLISHER: American Ceramic Society

DOCUMENT TYPE: Journal
LANGUAGE: English
REFERENCE COUNT: 11 THERE ARE 11 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L7 ANSWER 3 OF 9 CAPLUS COPYRIGHT 2004 ACS on STN

AB A composite sealant for in-situ sealing a fuel cell stack is provided. A paste of the sealant mixture is initially formed by mixing a glass precursor powder and a reacting filler material. The sealant mixture paste is applied to selected sealing locations of the fuel cell stack. The sealant mixture paste is then transformed into a composite sealant material to **seal** the selected sealing locations by heat treatment in air to about 900°. The composite sealant material comprises a glass matrix phase and a reinforcing phase including a plurality of interlocked elongated single crystal grains. The reacting fillers modify the CTE and significantly improve the gap filling capacity of the composite sealant material and provide superior **pressure** containment capability at elevated temps.

ACCESSION NUMBER: 2003:254165 CAPLUS
DOCUMENT NUMBER: 138:257919
TITLE: Composite sealant materials based on reacting fillers for **solid oxide fuel cells**
INVENTOR(S): Xue, Liang A.; Piascik, James; Yamanis, Jean
PATENT ASSIGNEE(S): Hybrid Power Generation Systems, LLC, USA
SOURCE: U.S., 9 pp.
CODEN: USXXAM
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 6541146	B1	20030401	US 2000-708334	20001107

PRIORITY APPLN. INFO.: US 2000-708334 20001107
REFERENCE COUNT: 9 THERE ARE 9 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L7 ANSWER 4 OF 9 CAPLUS COPYRIGHT 2004 ACS on STN

AB A novel hybrid compressive mica **seal** was developed that showed a reduction of leak rate by .apprx.4300 times (compared to simple mica **seals**) at 800°. The hybrid compressive mica **seal** is composed of 2 compliant glass layers and a mica layer. Three com. available micas were tested in hybrid compressive **seals** for **solid oxide fuel cell** applications. The best results were obtained using muscovite single crystal mica. The normalized leak rate for this **seal** at 800° was only 1.55 + 10-4 standard cm3/cm at a stress of 100 psi and a **pressure** gradient of 2 psi. **Seals** based on the other com. micas (muscovite and phlogopite mica papers), also exhibited superior leak rates (.apprx.0.011 standard cm3/cm) compared to simple mica **seals** without the compliant glass layer (about 6-9 standard cm3/cm). The microstructure of the mica was examined before and after the 800° leak tests using SEM. The cause for the substantial reduction of the leak rate was discussed. In addition, the effect of the compressive stresses was also investigated.

ACCESSION NUMBER: 2002:784075 CAPLUS
DOCUMENT NUMBER: 138:76075
TITLE: Ultra-low leak rate of hybrid compressive mica **seals for solid oxide fuel cells**
AUTHOR(S): Chou, Yeong-Shyung; Stevenson, Jeffry W.; Chick, Lawrence A.
CORPORATE SOURCE: Pacific Northwest National Laboratories, Materials

Resource Department, Richland, WA, 99352, USA

SOURCE: Journal of Power Sources (2002), 112(1), 130-136
CODEN: JPSODZ; ISSN: 0378-7753
PUBLISHER: Elsevier Science B.V.
DOCUMENT TYPE: Journal
LANGUAGE: English
REFERENCE COUNT: 10 THERE ARE 10 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L7 ANSWER 5 OF 9 CAPLUS COPYRIGHT 2004 ACS on STN

AB The detrimental thermal stresses in planar SOFC stacks can be reduced using sliding **seals**. In the proposal planar stack, the electrolyte film is sandwiched by YSZ support rings to release the thermal stresses. In order to estimate the strength of the support ring, the frictional forces between heat resistant alloy and YSZ were measured at 900°. The coefficient of friction between Hastelloy X and YSZ increased when they were measured after 144 h heating. However, the coefficient of friction between HA-214 and YSZ did not increase. The measurement and a calcn. of the stresses in the support rings led the result that a thickness of 0.6 mm was necessary for 200 mm diameter support rings under a stack **pressure** of 0.1 kg/cm2.

ACCESSION NUMBER: 1996:352748 CAPLUS
DOCUMENT NUMBER: 125:15148
TITLE: Frictional forces in an SOFC stack with sliding **seals**
AUTHOR(S): Yamazaki, Tatsuya; Oishi, Naoki; Namikawa, Tatsuru; Yamazaki, Yohtaro
CORPORATE SOURCE: Dep. Electron. Chem., Tokyo Inst. Technol., Yokohama, 226, Japan
SOURCE: Denki Kagaku oyobi Kogyo Butsuri Kagaku (1996), 64(6), 634-637
CODEN: DKOKAZ; ISSN: 0366-9297
PUBLISHER: Denki Kagaku Kyokai
DOCUMENT TYPE: Journal
LANGUAGE: English

L7 ANSWER 6 OF 9 CAPLUS COPYRIGHT 2004 ACS on STN

AB The authors investigated a new planar **solid-oxide fuel cell** (SOFC) stack in which thermal stresses are reduced using sliding **seals**. Planar SOFC single stacks with flexible interconnections and sliding **seals** were assembled and tested in thermal cycles between room temperature and 900°. Planar cells made of 250 μm thick and 80 mm in diameter 8 mol% Y2O3-stabilized ZrO2 (YSZ) electrolyte sheets with Pt anodes and Pt cathodes were stacked. The cells showed the open-circuit voltage (OCV) of 1.07 V at 900°. Another cell with Ni/YSZ cermet anode and Pt cathode showed the OCV of 1.08 V and c.d. of 270 mA/cm2 at 0.6 V. There were no damages in the electrolyte in the cells which had been repeatedly heated at the rate of 200°/h with a stack **pressure** of 0.1 kg/cm2. From these results, it is concluded that the sliding **seal** is effective to reduce the thermal stresses induced in alloy separator planar stacks.

ACCESSION NUMBER: 1996:352745 CAPLUS
DOCUMENT NUMBER: 125:15146
TITLE: Thermal cycle tests of a planar SOFC stack with flexible interconnections and sliding **seals**
AUTHOR(S): Oishi, Naoki; Namikawa, Tatsuru; Yamazaki, Yohtaro
CORPORATE SOURCE: Dep. Electron. Chem., Tokyo Inst. Technol., Yokohama, 226, Japan
SOURCE: Denki Kagaku oyobi Kogyo Butsuri Kagaku (1996), 64(6), 620-623
CODEN: DKOKAZ; ISSN: 0366-9297
PUBLISHER: Denki Kagaku Kyokai
DOCUMENT TYPE: Journal
LANGUAGE: English

L7 ANSWER 7 OF 9 CAPLUS COPYRIGHT 2004 ACS on STN

AB O permeation through La0.7Ca0.32CrO3-δ was investigated by an electrochem. method at partial **pressure** of O in the range 10-16-10-2 bar with an emphasis on effects of chemical inhomogeneity in samples, their thickness, and O partial **pressure** at the high O potential side. Chemical inhomogeneity of the sample made no difference. The O permeation increased in the O partial **pressure** range of 10-16-10-10 bar at the lower O potential side. Effects of atmospheric in the high O potential side were significant for both leak flux through side **seals** and the O permeation flux. The measured O permeation values were two order of magnitude lower than that calculated by using a vacancy diffusion coefficient of 1 + 10-5 cm2/s at 1273 K which seems typical among many perovskite materials. This suggests that the vacancy diffusion coefficient may be on the order of 10-7 cm2/s in La0.7Ca0.3CrO3-δ and/or the surface reaction may be rate limiting.

ACCESSION NUMBER:	1993:499802 CAPLUS
DOCUMENT NUMBER:	119:99802
TITLE:	Oxygen permeation and related phenomena of lanthanum calcium chromites as SOFC interconnects
AUTHOR(S):	Yokokawa, Harumi; Horita, Teruhisa; Sakai, Natsuko; van Hassel, Bart A.; Kawada, Tatsuya; Dokiya, Masayuki
CORPORATE SOURCE:	Tsukuba Res. Cent., Natl. Chem. Lab. Ind., Tsukuba, 305, Japan
SOURCE:	Proceedings - Electrochemical Society (1993), 93-4(Proceedings of the Third International Symposium on Solid Oxide Fuel Cells, 1993), 364-73 CODEN: PESODO; ISSN: 0161-6374
DOCUMENT TYPE:	Journal
LANGUAGE:	English

L7 ANSWER 8 OF 9 CAPLUS COPYRIGHT 2004 ACS on STN

AB Gas **seal** technol. for high-temperature apparatus is essential to develop high-performance planar **solid-oxide fuel-cell** stacks, and quant. investigations of the gas leaks between electrolytes and separators are required. An apparatus was designed for measuring the gas leaks through the contact between heat-resistant alloy disks and Y2O3-stabilized ZrO2 (YSZ) plates. By using the apparatus, gas leak rates of N and H through the contact between the materials were measured from room temperature to 1000°. The gas leak rates were measured for various contact **pressure** and contact areas. When the temperature was raised from room temperature to 1000°, gas leak rates of both N and H gases decreased considerably. The gas leak rate for H at 1000° was about 1/3 of that at room temperature

ACCESSION NUMBER:	1993:476262 CAPLUS
DOCUMENT NUMBER:	119:76262
TITLE:	Measurement of gas leaks through the contacts between heat resistant alloy disks and YSZ plates
AUTHOR(S):	Tomita, Naoya; Namikawa, Tatsuru; Yamazaki, Yohtaro
CORPORATE SOURCE:	Dep. Electron. Chem., Tokyo Inst. Technol., Yokohama, 227, Japan
SOURCE:	Proceedings - Electrochemical Society (1993), 93-4(Proceedings of the Third International Symposium on Solid Oxide Fuel Cells, 1993), 656-62 CODEN: PESODO; ISSN: 0161-6374
DOCUMENT TYPE:	Journal
LANGUAGE:	English

L7 ANSWER 9 OF 9 CAPLUS COPYRIGHT 2004 ACS on STN

AB A tubular SOFC (**solid oxide fuel cell**) was fabricated by low **pressure** plasma spray coating of Y2O3-stabilized ZrO2, to produce dense film electrolytes. The electrolyte film was deposited on a substrate that already had a support tube, a spray-coated LaSrMnO3 or LaCoO3 air electrode, and a LaCaCrO3

interconnect. The structure was completed by spray-coating the fuel electrode, NiO-Y_2O_3-stabilized ZrO_2, and applying an end **seal**.

ACCESSION NUMBER: 1992:197600 CAPLUS
DOCUMENT NUMBER: 116:197600
TITLE: The fabrication study on tubular type SOFC applied with plasma spray coating
AUTHOR(S): Kaji, I.; Yoshida, S.; Nagata, M.; Nakajima, T.; Seino, Y.
CORPORATE SOURCE: Fujikura Ltd., Tokyo, Japan
SOURCE: Comm. Eur. Communities, [Rep.] EUR (1991), EUR 13564, Proc. Int. Symp. Solid Oxide Fuel Cells, 2nd, 1991, 221-8
CODEN: CECED9; ISSN: 0303-755X
DOCUMENT TYPE: Report
LANGUAGE: English

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     FILE 'STNGUIDE' ENTERED AT 17:41:55 ON 26 MAY 2004

     FILE 'HOME' ENTERED AT 17:42:01 ON 26 MAY 2004

     FILE 'CAPLUS' ENTERED AT 17:42:16 ON 26 MAY 2004
L1           4404 S SOLID OXIDE FUEL CELL
L2              5 S L1 AND (PRESSURE (S) VESSEL)
L3              1 S L1 AND RING AND SEAL
L4              0 S L1 AND VESSEL AND SEAL
L5             90 S L1 AND SEAL
L6              0 S L5 AND (GENERAL ELECTRIC)
L7              9 S L5 AND PRESSURE
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	Type	Hits	Search Text	DBs
1	BRS	1772	429/30,34,35,38.ccls.	USPAT
2	BRS	783	solid adj oxide adj2 fuel adj cell	USPAT
3	BRS	2711	solid adj oxide adj2 fuel adj cell	USPAT; US-PGPUB; EPO; JPO; DERWENT
4	BRS	250	(solid adj oxide adj2 fuel adj cell) and hexagonal	USPAT; US-PGPUB; EPO; JPO; DERWENT
5	BRS	199	((solid adj oxide adj2 fuel adj cell) and hexagonal) and seal and pressure	USPAT; US-PGPUB; EPO; JPO; DERWENT
6	BRS	21	(((solid adj oxide adj2 fuel adj cell) and hexagonal) and seal and pressure) and 429/$.ccls.	USPAT; US-PGPUB; EPO; JPO; DERWENT
7	BRS	0	10/063,211	USPAT
8	BRS	1	10/063,211	USPAT; US-PGPUB
9	BRS	0	(10/063,211 and seal) and vessel	USPAT; US-PGPUB
10	BRS	1	10/063,211 and seal	USPAT; US-PGPUB
11	BRS	2717	solid adj oxide adj2 fuel adj cell	USPAT; US-PGPUB; EPO; JPO; DERWENT
12	BRS	579	(solid adj oxide adj2 fuel adj cell) and interconnect	USPAT; US-PGPUB; EPO; JPO; DERWENT
13	BRS	261	((solid adj oxide adj2 fuel adj cell) and interconnect) and seal	USPAT; US-PGPUB; EPO; JPO; DERWENT
14	BRS	173	(((solid adj oxide adj2 fuel adj cell) and interconnect) and seal) and 429/$.ccls.	USPAT; US-PGPUB; EPO; JPO; DERWENT
15	BRS	88	(((solid adj oxide adj2 fuel adj cell) and interconnect) and seal) not ((((solid adj oxide adj2 fuel adj cell) and interconnect) and seal) and 429/$.ccls.)	USPAT; US-PGPUB; EPO; JPO; DERWENT

	Type	Hits	Search Text	DBs
16	BRS	173	(((solid adj oxide adj2 fuel adj cell) and interconnect) and seal) and 429/$.ccls.	USPAT; US-PGPUB; EPO; JPO; DERWENT
17	BRS	132	((((solid adj oxide adj2 fuel adj cell) and interconnect) and seal) and 429/$.ccls.) and (pressurized pressure)	USPAT; US-PGPUB; EPO; JPO; DERWENT
18	BRS	0	2003/0012997	USPAT; US-PGPUB; EPO; JPO; DERWENT
19	BRS	2	"20030012997"	USPAT; US-PGPUB; EPO; JPO; DERWENT
20	BRS	1	"20030012997" and stacks	USPAT; US-PGPUB; EPO; JPO; DERWENT
21	BRS	1	"20030012997" and seal	USPAT; US-PGPUB; EPO; JPO; DERWENT
22	BRS	1	"20030012997" and (parallel series)	USPAT; US-PGPUB; EPO; JPO; DERWENT
23	BRS	1	"20030012997" and sealer	USPAT; US-PGPUB; EPO; JPO; DERWENT
24	BRS	1	"20030012997" and manifold and (interconnector interconnect)	USPAT; US-PGPUB; EPO; JPO; DERWENT
25	BRS	2	"20030012997" and (heat adj exchanger)	USPAT; US-PGPUB; EPO; JPO; DERWENT